PACIFIC GAS AND ELECTRIC COMPANY
CHAPTER 9
ENERGY EFFICIENCY IN PG&E'S LONG-TERM RESOURCE PLAN AND THE DIABLO CANYON STEAM GENERATOR REPLACEMENT PROJECTS

A. Introduction

The purpose of this testimony is to explain the relationship between Pacific Gas and Electric Company's (PG&E or the Company) long-standing commitment to pursue cost-effective Customer Energy Efficiency (CEE) and its proposal to replace the Steam Generators at Diablo Canyon, and how these two resources fit in PG&E's electric supply portfolio. Since the 1980s, PG&E has made cost-effective CEE a core element of its electric supply portfolio. The Company includes CEE in its procurement plans in a manner consistent with the California Public Utilities Commission's (CPUC or Commission) preferred loading-order policy that resource adequacy first be met through cost-effective energy efficiency programs, cost-effective demand reduction programs, and cost-effective renewable resources.**[1]**

PG&E's analysis shows that incremental cost-effective CEE above the amounts included in PG&E's resource plans does not appear to be a substitute for the Steam Generator Replacement Projects (the Projects). It is unlikely that there are enough additional sources of CEE available at this time to replace the large quantity of energy represented by the Projects. PG&E has been pursuing and will continue to aggressively pursue cost effective CEE in its service territory as one of its primary resources, whether the Diablo Canyon steam generators are replaced or not.

B. 2003 Long Term Plan: CEE and Diablo Canyon

PG&E's Long Term Procurement Plan covering 2004-2023 submitted on April 15, 2003, in Rulemaking 01-10-024 (2003 LTP) proposed a substantial increase in CEE load reductions through additional funding. It assumed that the public goods charge (PGC) that has funded CEE programs will continue. PG&E

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[1] See, for example, R.01-10-024 "Pacific Gas and Electric Long-Term Procurement Plan," April 15, 2003, pp. 1-36, 6-1.

forecasts that these CEE programs will produce on average about 460 GWh of new load reductions each year.[2] Additionally, the 2003 LTP also proposed a ramp-up of procurement-funded CEE investment during 2004-2008 so that by 2008, total electric CEE investment would be approximately twice 2003 levels. Programs were then forecast to continue at an expanded level through the forecast period (through 2023). Because of CEE, it is estimated that annual loads in 2023 will be lower by about 14,200 GWh (about 9,200 GWh from PGC funded programs, and 5,000 GWh from the additional activities in the 2003 LTP). The levelized cost of the proposed expansion of CEE is 2.8 cents/KWh.[3] In this testimony, "Option 0" refers to the additional CEE included in the 2003 LTP above PGC funding.

The 2003 LTP assumed that Diablo Canyon's typical annual output of over 17,000 GWh continued to be available throughout the 20-year planning horizon. Simultaneous pursuit of expanded CEE and the continued operation of Diablo Canyon were two integral and large components of the 2003 LTP.

In June this year, PG&E anticipates filing a new long-term procurement plan (the 2004 LTP) as ordered by the Commission in Decision 04-01-050. The 2004 LTP will follow an integrated resource approach and will identify new opportunities for CEE investment beyond that proposed in the 2003 LTP. Among other enhancements, PG&E will incorporate updated information on energy efficiency potential, including consideration and probable inclusion of the options discussed in the next section, and the impacts of new and emerging energy efficiency technologies.

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[2] This is the average level of reductions over the period 1993-2002. The CPUC selects the PGC funded activities to achieve a portfolio balanced from their perspective according to its Energy Efficiency Policy Manual, Version 2, August 2003.

[3] This and other elements of the analysis as discussed in this testimony are summarized in Table 1 on p. 8.

C. Additional Cost Effective Customer Energy Efficiency Considered During Analysis of the Projects

In its analysis of the Projects, PG&E reviewed the existing research on energy efficiency potential in California[4] in order to assess what amounts of energy efficiency weren't already incorporated into the 2003 LTP. Using the potential studies' guidepost of "maximum achievable potential,"[5] PG&E identified additional amounts of CEE over and above the expanded levels included in the 2003 LTP. PG&E's objective was to assess whether there are opportunities to increase investments in cost-effective energy efficiency activity, either by expanding existing programs or initiating new programs.

Two additional options for energy efficiency potential were identified. "CEE Option 1" represented additional load reductions of 1,400 GWh at a levelized cost of 4.8 cents per kWh. "CEE Option 2" included Option 1 and represented an additional load reduction of 1,600 GWh totaling 3,000 GWh at a levelized cost of about 5.7 cents per kWh.[6] For planning purposes, it was assumed that these additional options would begin reducing load in 2008, with full reduction by 2013. These additional levels of CEE were considered in the analysis of alternatives summarized in the next section.

PG&E's analysis found that the amounts of CEE identified in the potential studies as "maximum achievable," but not yet included in its long-term procurement plans, would not alone be sufficient to replace Diablo Canyon's output. As noted above, the total additional CEE identified as potentially available would produce annual load reductions of 3,000 GWh, much smaller than Diablo Canyon's typical annual output of over 17,000 GWh.

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[4] These include the Xenergy, Inc., *California Statewide Commercial Sector Energy-Efficiency Potential Study*, prepared for PG&E, July 2002, and Xenergy, Inc., *California* Statewide Residential Sector Energy-Efficiency Potential Study, prepared for PG&E, January 2003. These are available at www.calmac.org. Studies of the Industrial and New Construction sectors are in progress, but not completed.

[5] Defined as "the amount of economic (cost-effective) potential that could be achieved over time under the most aggressive program scenario possible." *California* Statewide Residential Sector Energy-Efficiency Potential Study, p. 4-17.

[6] As PG&E considers adding more CEE to its long-term plans, it is moving up a supply curve of alternatives, thus the latter increments tend to cost more than the earlier additions.

Aside from the analysis associated with the Projects, the identification of additional CEE alternatives provides a starting point for PG&E's consideration of CEE in its next LTP. There, PG&E plans an analysis of increased investment in CEE including the potential identified in Options 1 and 2, other opportunities that may be identified in soon-to-be-completed CEE potential studies, and the impact of new technologies. The 2004 LTP will continue to reflect PG&E's commitment to pursue cost-effective CEE consistent with the "loading order" and least cost/best fit resource portfolio planning. Thus, PG&E expects to fully consider and likely include the CEE resources identified in Option 1 or Option 2, even if the Projects are approved and implemented.

D. Comparing the Cost of the Projects, CEE and the Replacement Alternatives

In order to evaluate the costs and benefits of the Projects, PG&E examined the cost of the other resources PG&E would be required to obtain should Diablo Canyon not be available. The first step in this analysis was to rank resources to determine which would be candidates to replace Diablo Canyon should the Projects not be completed. Consistent with the 2003 LTP portfolio analysis approach[7] and the CPUC's preferred loading-order policy, PG&E examined the cost and availability of the Projects, CEE, renewable energy resources, new gas fired combined cycle generation and market purchases, using the levelized cost of energy to evaluate each option. As shown in Table 1, the results of the analysis showed that the levelized cost of market purchases, new renewable energy and new gas fired combined cycle generation alternatives was about 6 cents per kWh. The levelized cost of the CEE options not already include in the 2003 LTP ranged from 4.8 cents per kWh to 5.7 cents per kWh. As stated in Chapter 5, levelized alternative energy prices would need to be 3.9 cents per kWh to reduce the net benefits of the Projects to zero.

PG&E's analysis showed that both the Projects and the three CEE options provide resources at well under 6 cents/kWh. In addition, some resources with levelized costs at about 6 cents/kWh would be needed to meet demand if the

[7] As discussed previously, PG&E will be filing its 2004 LTP on the schedule established by the Commission, including filing a working outline by the end of March, as required by D.04-01-050. The integrated resource approach outlined by the Commission will be used in the 2004 LTP.

steam generators were not replaced. Hence, the cost of the marginal resources is about 6 cents/kWh.

E. Conclusion

PG&E's proposal to replace the steam generators is consistent with a balanced portfolio strategy that includes cost effective CEE as a primary resource. PG&E's pursuit of CEE is aggressive, such that there is currently not a large pool of incremental CEE available in its service territory to substitute for the Projects. Both Diablo Canyon and expanded CEE are essential contributors to PG&E's plans to meet the future resource needs of its customers.

PACIFIC GAS AND ELECTRIC COMPANY
TABLE 9-1
ASSESSING ALTERNATIVE RESOURCES

Line No.	Resource	Resource Type	Operating Years	Amount (GWh/yr)	Levelized Cost (cents/kWh)	Line No.
1	Market Purchases (Ch 6, Sec. D)	Baseload	2013-2025	Up to 17,000	6.0(a)	1
2	Combined Cycle (Ch 6, Sec. E)	Baseload	2013-2029	Up to 17,000	6.0(b)	2
3	Renewables (Wind) (Ch t. Sec. F)	Intermittent	2013-2029	1,700	6.0(c)	3
	Additional Energy Efficiency to be considered in PG&E's 2004 LTP					
4	CEE Option 2	Additional load reduction – includes option 1	2008-2023	2,959	5.7	4
5	CEE Option 1	Additional load reduction	2008-2023	1,385	4.8	5
	Energy Efficiency already included in PG&E's 2003 LTP					
6	Option 0 (in the 2003 LTP)	Air conditioning and commercial lighting load reduction during 2004-2006; expanding to all technologies after 2007	2004-2023	Up to 5,000	2.8(d)	6
7	PGC funded programs	Programs for all customers	2004-2023	Up to 9,200	NA(e)	7

(a) Table 6.4, row 18.

(b) Table 6.5, row 18.

(c) Table 6.6, row 18.

(d) Calculated over the entire planning horizon of 2004-2042. The Office of Ratepayer Advocates (ORA) computed the levelized costs for 2004 to 2008 as 2.09, 2.38, 2.8, 2.73, 3.08 cents/kWh respectively showing costs rising. See ORA, "Long-Term and 2004 Procurement Plans Direct Testimony" in Rulemaking 01-10-024, page 51, filed June 23, 2003.

(e) PG&E believes the levelized cost of its PGC-funded programs is about 3.2 cents/kWh, the value determined by Global Energy Partners in its study: "California Summary Study of 2001 Energy Efficiency Programs," available at www.calmac.org as Report ID# 02-1099.